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(54) **Convertible Seat or Convertible Seating Unit for Fixed Installation in Vehicles**

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Title: **Convertible Seat or Convertible Seating Unit for Fixed Installation in Vehicles**

The present invention pertains to a convertible seat or convertible seating unit for fixed installation in sleeping cars and cars with reclining berths, mobile homes, campers or the like according to the preamble of claim 1.

Such convertible seating units, in which not only the upholstered backrest but also the upholstered sitting surface have a dual function, are well known, in particular for rail-borne cars with reclining berths. Both the upholstered side of the seat and that of the backrest are used as sitting surface and reclining surface in the sitting position and as reclining surface in the reclining position. However, this is incompatible with a sufficient sitting comfort, on the one hand, and with a reclining comfort, on the other hand, because upholstery hardness alone must already be different for this. On the other hand, the use of at least the reclining upholstery as a reclining surface requires an essentially horizontal, flat alignment, with which specially formed contours for adapting to the human back are not taken into consideration. The same is basically also true for the sitting upholstery, which is usually fixed in flat, horizontal alignment and therefore lacks the sitting surface slope necessary for a comfortable seat.

In spite of this twofold use possibility of the sitting surface and the reclining surface in the prior-art embodiment of cars with reclining berths, handling-related drawbacks must also be accepted. The pivotable backrest is suspended on complicated metal fittings, because it is coupled along its upper edge, and consequently must be pivoted up at its lower edge, after which it must then take up the appropriate distance for the seat upholstery and additionally be locked.

The basic object of the present invention is therefore to create a convertible seat or a convertible seating unit of the type mentioned in the introduction that offers a high sitting and reclining comfort and is simple to handle.

This object is accomplished with a convertible seat or a convertible seating unit of the type forming this class according to the present invention by means of the characterizing features of claim 1.

It is essential to the present invention to use only the backrest, which is pivotable anyway, to form the reclining surface, which [backrest] has reclining upholstery at its rear, which is not needed in the sitting position, and reclining upholstery at its front, which can be formed according to anatomical

conditions. The same is true for the sitting surface, since it does not have a function in the reclining position of the convertible seat or convertible seating unit.

Features of advantageous embodiments of the present invention appear from the subclaims.

The present invention is explained in detail below based on the drawing of exemplary embodiments. In the drawing:

- Figure 1 shows the top view of convertible seating units in a car with reclining berths,
- Figure 2 shows the side view of such seating units in a car with reclining berths,
- Figure 3 shows the front view of two single seats of a convertible seating unit in a car with reclining berths,
- Figure 4 shows the front view of a double seat of a convertible seating unit in a car with reclining berths,
- Figure 5 shows the side view of the double seat according to Figure 4 with opposing seat,
- Figure 6 shows a perspective view of a single convertible seat corresponding to the preceding figures,
- Figure 7 shows a view of the single seat with backrest pivoted forwards halfway according to Figure 6, and
- Figure 8 shows two single seats opposing one another according to Figures 6 and 7 with the backrests pivoted over.

A plurality of single seats 1 opposing one another, which have a contoured sitting surface 2, which slopes slightly from front to back, as Figure 2 shows clearly, is recognized in detail in the car with reclining berths of Figure 1. A backrest 3, which has a front lying towards the sitting surface 2 and a rear, is directly connected at the rear area of the sitting surface 2. The front of the backrest 3 has a contoured reclining upholstery 4, which is equipped with laterally projecting side walls 13 for side guiding. A headrest 14 in the shape of a cushion set off from the reclining upholstery 4 may be present at the backrest 3 above the reclining upholstery 4.

At the rear, the backrest 3 has a reclining upholstery 5, which is continuously flat. If the seats 1 are single seats, the reclining upholstery 5 has a length at the rear of each backrest 3 that corresponds to a half reclining surface. Consequently, the reclining upholsteries 5 of two backrests 3 opposing one another complement each other to form a reclining surface that is interrupted by a butt joint 20.

The backrests 3 of the seats 1 are pivotable to be able to convert them from a seat into a reclining berth. To this end, the backrests 3 are pivoted over forwards in order to be converted from a sitting position into a reclining position, whereby, in the latter, the rear reclining upholsteries 5, which are flat on the top side, lie essentially horizontal. Corresponding to the then above-lying arrangement of the reclining upholsteries 5, the reclining upholsteries 4 of the backrests 3 are arranged in the downwards direction and dip between side parts 6 and 7 of seat frames 8, which project upwards over the sitting surfaces 2. The side parts have contact surfaces 15 and 16 on the top side, which may also be at least partly upholstered, on which the backrests 3 are supported in their reclining

position. As Figure 3 makes clear, the backrests 3 have support surfaces 17 and 18, which, in the reclining position of the backrests 3, come into contact with the contact surfaces 15 and 16 of the side parts 6 and 7 of the seat frames 8, on the right and on the left of the reclining upholsteries 4 at the front.

The pivotability of the backrests 3 is especially illustrated in the view on the left of Figure 2. The backrests 3 are pivotable about only a single axis 9, which is located on one fourth of the height of the backrests 3, viewed in the height direction. Thus, the backrest 3 projects considerably up to its lower edge 10 beyond the axis 9, whereby, when the backrest 3 is flipped over, the lower edge 10 of the backrest 3, and herewith especially the lower area of the reclining upholstery 5, pivots upwards. In the sitting position, the backrest 3 is supported, rearwards, at a partition 11, or reaches almost up to this partition 11 at least with its upper edge 12. On the other hand, the pivoting axis 9 is moved from this partition 11 forwards, with which the basic plane of the backrest 3 in the sitting position is sloped to the upper edge 12 and rearwards from the sitting surface 2. As a result, a favorable sitting position in coordination with the rearwards sloping sitting surface 2 is formed in the sitting position. From the sitting position 2, the backrest, according to the arrows shown in the left view in Figure 2, is pivoted over forwards until the horizontal arrangement of the reclining upholsteries also shown there is reached, which together form a reclining surface, as is clear from, among others, Figure 4, top left. The pivoting of the backrests 3 about only a single axis 9 makes the operation simple, and by means of pivoting up the lower edge 10 of the backrests 3, the gap to the partition 11 caused by the offset of the pivoting axis forwards is closed.

Figures 1 through 3 show seats 1 embodied as single seats, whose backrests 3 complement each other with their rear reclining upholsteries 5 in the reclining position to form the reclining surface. Such a position of the seats 1 is preferably arranged in a car with reclining berths in the direction of travel or against the direction of travel. Figures 4 and 5 show seats 1, which complement each other to form a double seat, wherein both seats 1 have a continuous backrest 3, which is equipped, at the front, with [sic, "mir" is an obvious typo for "mit" - Tr.Ed.] two reclining upholsteries 4, which are assigned to each of the seats 1. This seating arrangement is primarily suitable for installation at right angles to the direction of travel in a car with reclining berths. The reclining upholstery 5 at the rear of the backrest 3 is likewise continuous, and thus, the reclining upholstery 5 is not excessively wide; in this version, the headrests 14 are rigidly installed above the backrest 3, i.e., arranged at the backrest 3 in a nonpivotable manner.

In the seats 1 forming the double seats, the pivotability of the backrest 3 is, in principle, the same as in the backrest 3 for the seats 1 embodied as single seats. Viewed in the height direction, which thus corresponds to the width direction of the reclining upholstery 5, the single pivoting axis 9, which is arranged in the same manner at a distance in front of the partition 11, is also present at about the height of one fourth or one third.

Figures 6, 7 and 8 illustrate, in different views, with the seats 1 embodied as single seats, the sitting position (Figure 6), an intermediate position with the backrest 3 pivoted over (Figure 7), and the reclining position of two seats 1 opposing one another (Figure 8). The seats opposing one another are identical, but have side parts 7 and 8 of different widths, whereby the sitting surfaces 2 of the seats 1 opposing one another are not exactly aligned with one another in the direction of travel. This is also recognized in Figure 1, whereby the advantage appears that people sitting opposite one another can place their legs next to one another without having to distress one another.

For the backrests 3, the offset arrangement applies only to the reclining upholstery 4 and headrest 14, the rear reclining upholsteries 5 are in alignment with one another in their lengthwise direction

in order to form the reclining surface of sufficient length together. The butt joint 20 caused by this is negligible, because the two complementary reclining upholsteries 5 in the reclining position of the backrests 3 can be connected tightly to one another.

Furthermore, it is seen from Figures 6 and 7 that upholsteries 21 and 22, which function as armrest cushions in the sitting position and have a damping function in the reclining position, can be provided in the area of the contact surfaces 15 and 16 of the side parts 6 and 7 of the seat frames 8. Furthermore, Figures 7 and 8 illustrate the tipping of the back upholstery 4 between the side parts 6 and 7 of the seat frames 8 in the reclining position of the backrests 3.

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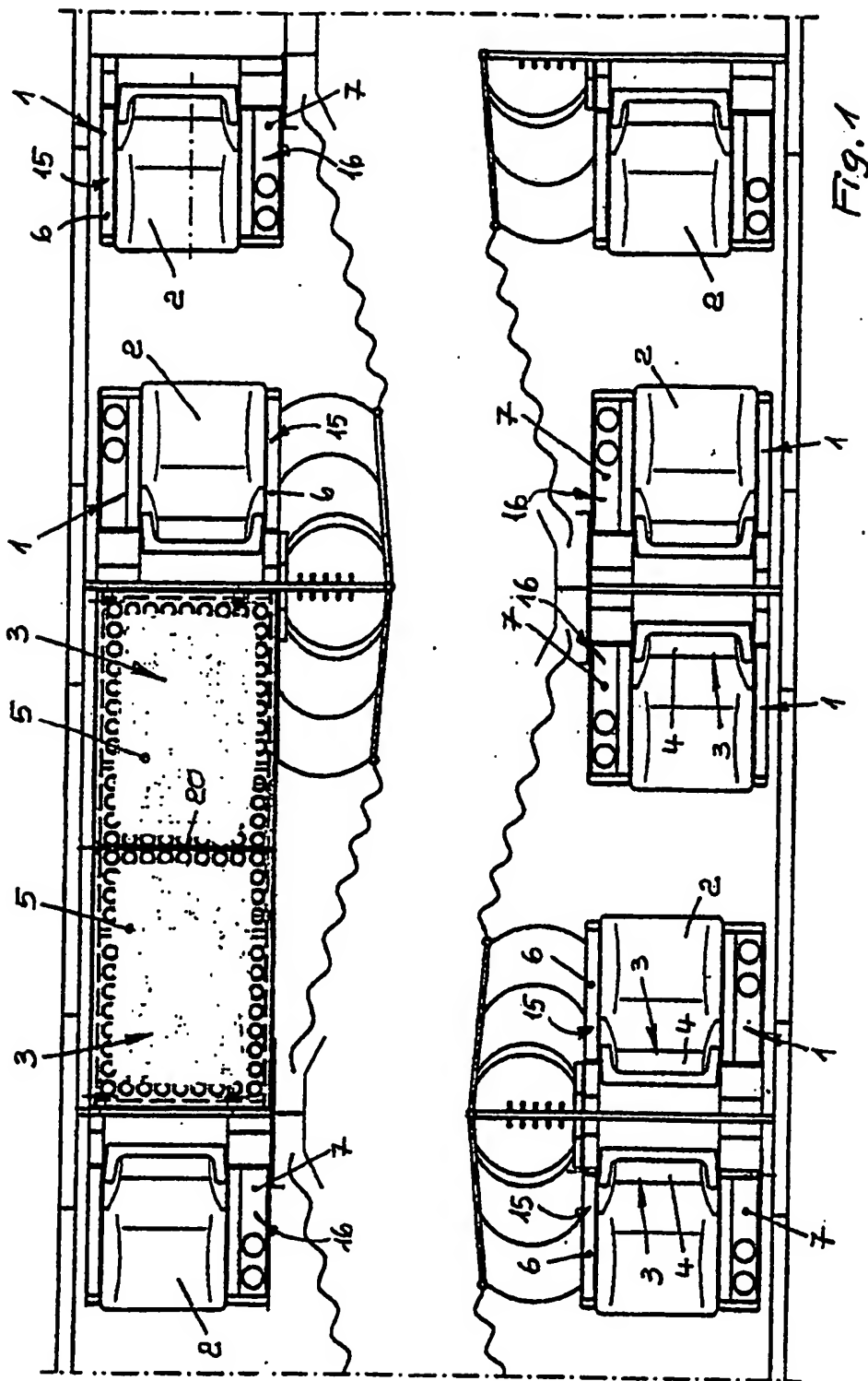
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Claims:

1. Convertible seat or convertible seating unit for fixed installation in sleeping cars and cars with reclining berths, mobile homes, campers or the like, with at least one sitting surface and one upholstered backrest, which is pivotable between an upright sitting position and an essentially horizontal, reclining position, characterized in that the said backrest (3) has a said reclining upholstery (4) at its front lying towards the said sitting surface (2) in the sitting position and a said reclining upholstery (5) at its rear and is pivotably coupled in such a way that the said reclining upholstery (5) is arranged on the uppermost side in its reclining position [sic, "Lieposition" is an obvious typo for "Liegeposition" - Tr.Ed.].
2. Convertible seat or convertible seating unit in accordance with claim 1, characterized in that the said reclining upholstery (5) of the said backrest (3) is essentially flat.
3. Convertible seat or convertible seating unit in accordance with claim 1 or 2, characterized in that approximately at the height of one fourth of its total height in the sitting position, the said backrest (3) is pivotable about a said single axis (9), which passes through the basic plane of the said backrest (3) or runs close to this plane.
4. Convertible seat or convertible seating unit in accordance with claim 3, characterized in that the said backrest (3) is mounted between said side parts (6, 7) of a said seat frame (8).
5. Convertible seat or convertible seating unit in accordance with claim 3 or 4, characterized in that the said backrest (3) with its said lower edge (10) reaches up to the said sitting surface (2) in relation to [sic, "auf auf" should simply be "auf" - Tr.Ed.] the sitting position.
6. Convertible seat or convertible seating unit in accordance with claim 5, characterized in that in its reclining position with its said lower edge (10) pivoted up, the said backrest (3) is connected to a said vertical partition (11).
7. Convertible seat or convertible seating unit in accordance with claim 6, characterized in that in its sitting position with its said upper edge (12), the said backrest (3) reaches up to the said partition (11) or abuts against it and is sloped away upwards and rearwards from the said sitting surface (2).

8. Convertible seat or convertible seating unit in accordance with one of the claims 4 through 7,
characterized in that
the said side parts (6, 7) of the said seat frame (8) [sic, have? - Tr.Ed.] said contact surfaces (15, 16) on the top side and the said backrest (3) has said lateral support surfaces (17, 18) at the front, which, in the reclining position, lie on the said contact surfaces (15, 16) of the said side parts (6, 7).
9. Convertible seat or convertible seating unit in accordance with claim 8,
characterized in that
the said reclining upholstery (4) of the said backrest (3) is anatomically contoured at its contact surface and has said forwards-projecting side walls (13) and/or a said headrest (14) between the said contact surfaces (15, 16) of the said backrest (3), which dip between the side parts (6, 7) of the said seat frame (8) in the reclining position of the said backrest (3).
10. Convertible seat or convertible seating unit in accordance with one of the claims 1 through 9,
characterized in that
two said seats are arranged opposite one another, the said backrests (3) of which are directly connected to one another in a common plane in the reclining position with the said reclining upholsteries (5), whereby the two said reclining upholsteries (5) together form a reclining surface.
11. Convertible seat or convertible seating unit in accordance with one of the claims 1 through 9,
characterized in that
two or three said seats (1) are arranged next to one another, which have a common backrest (3) with said reclining upholsteries (5) next to one another assigned to each of the said seats (1), and this said backrest (3), at its rear, has a said reclining upholstery (5) forming a said continuous reclining surface.



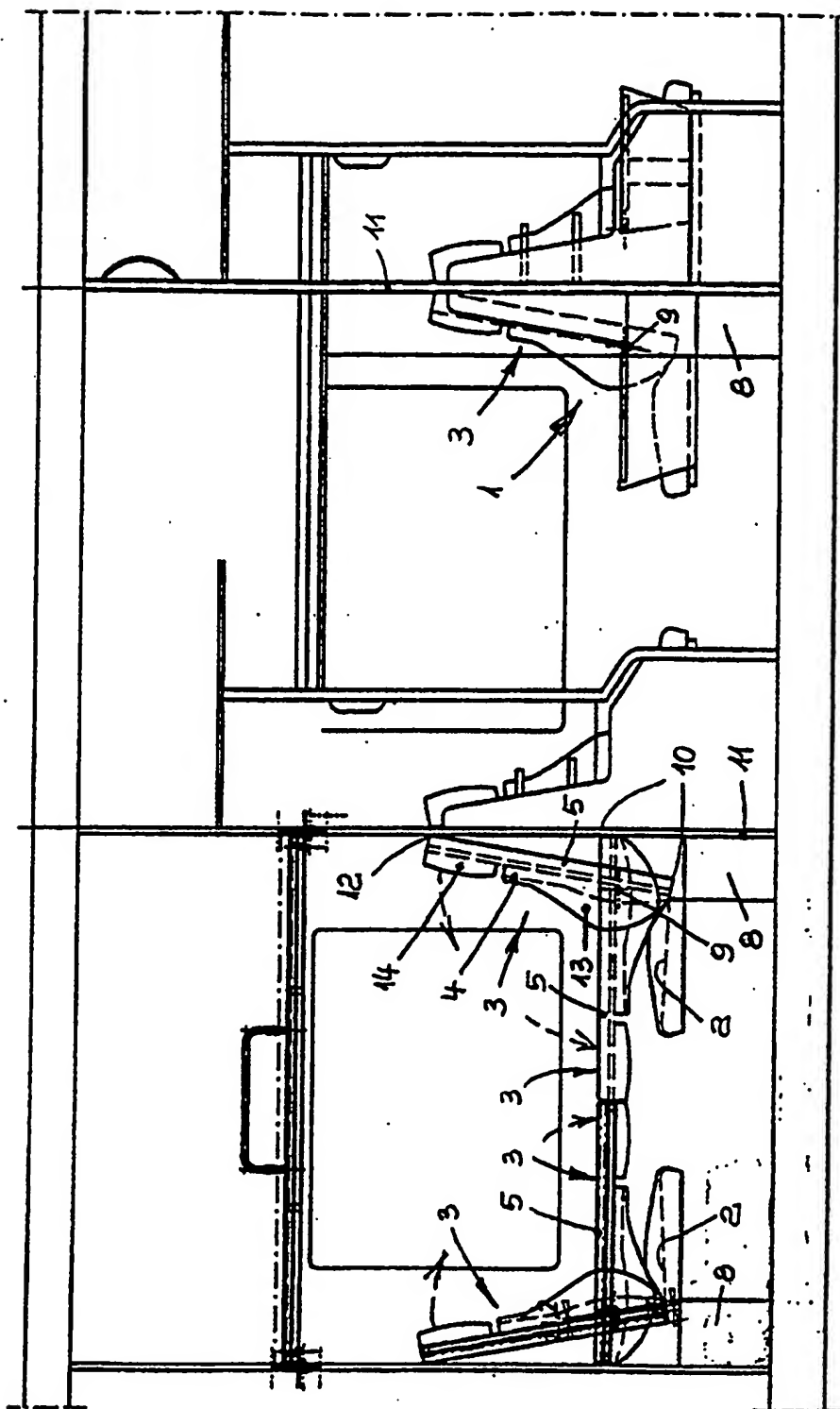
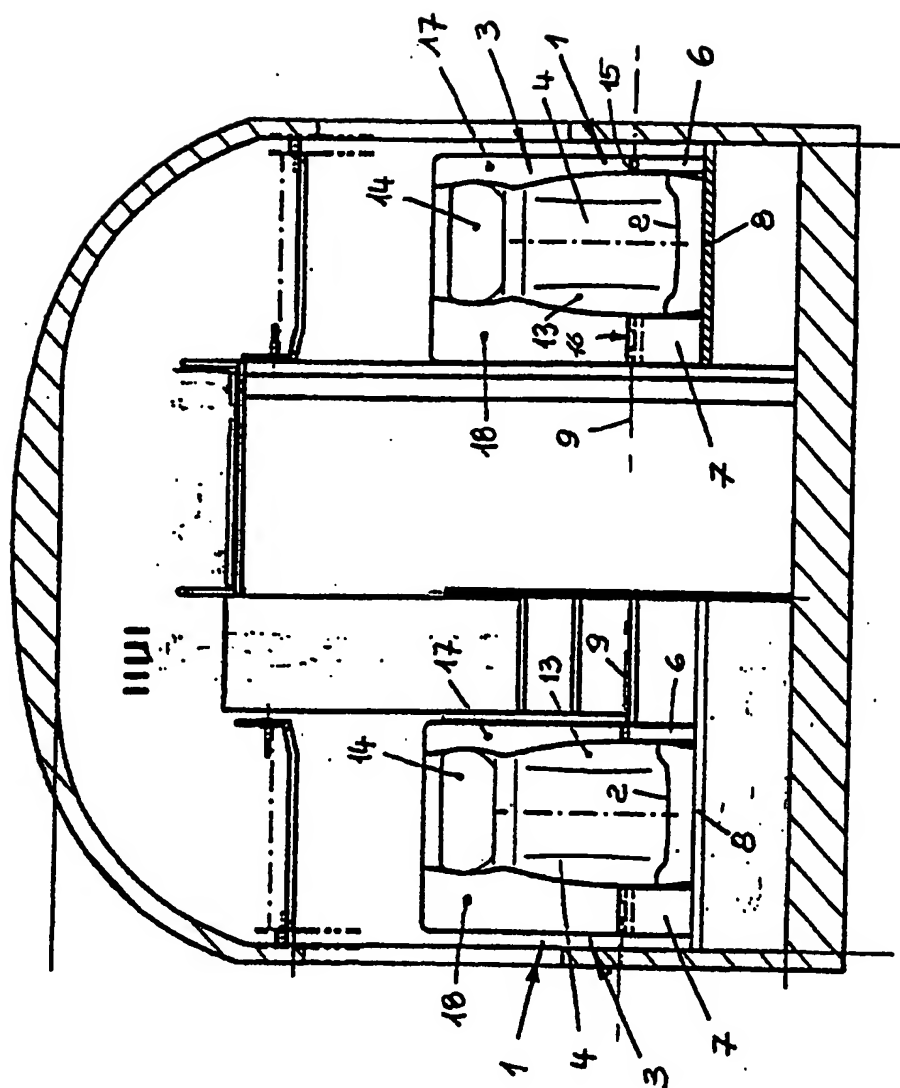


Fig. 2



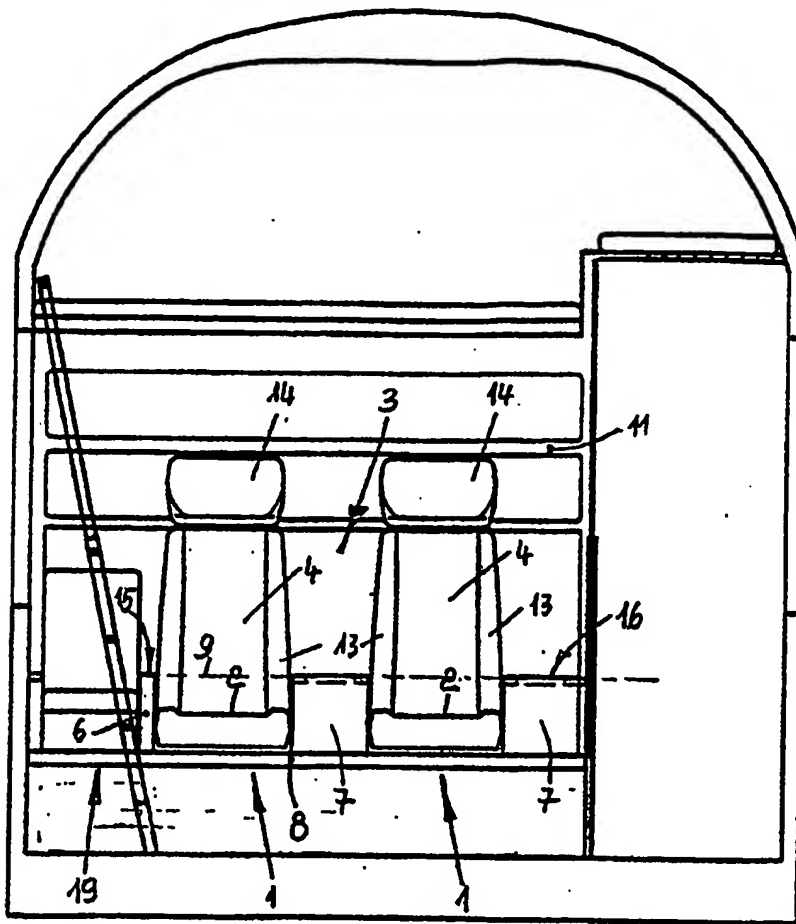


Fig. 4

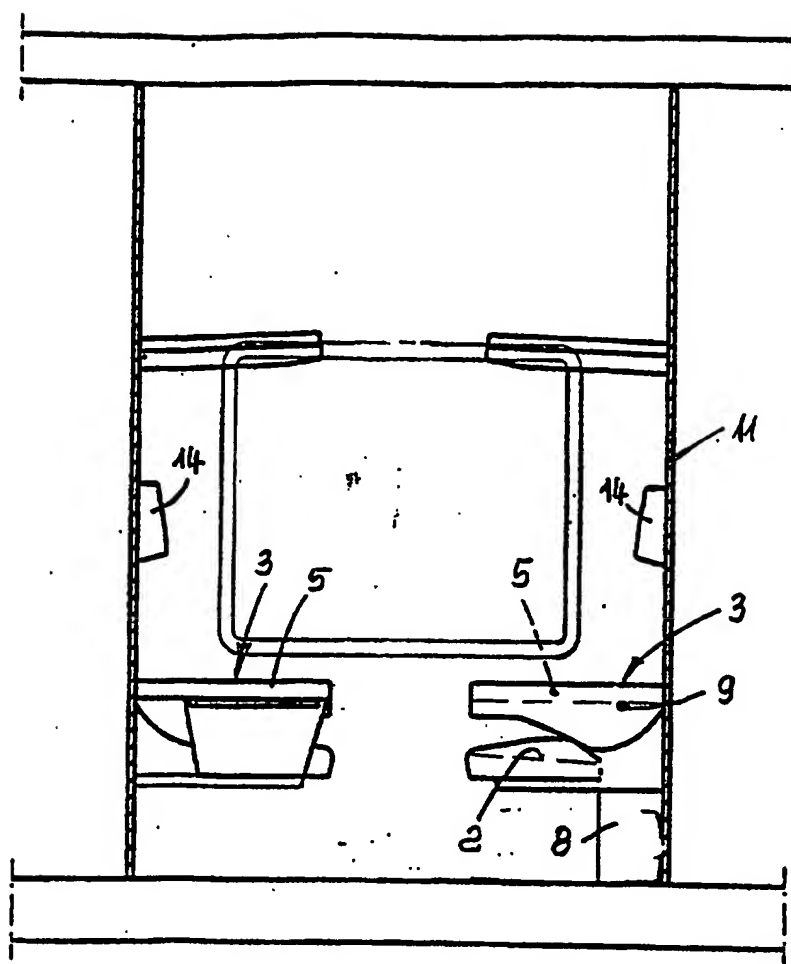


Fig. 5

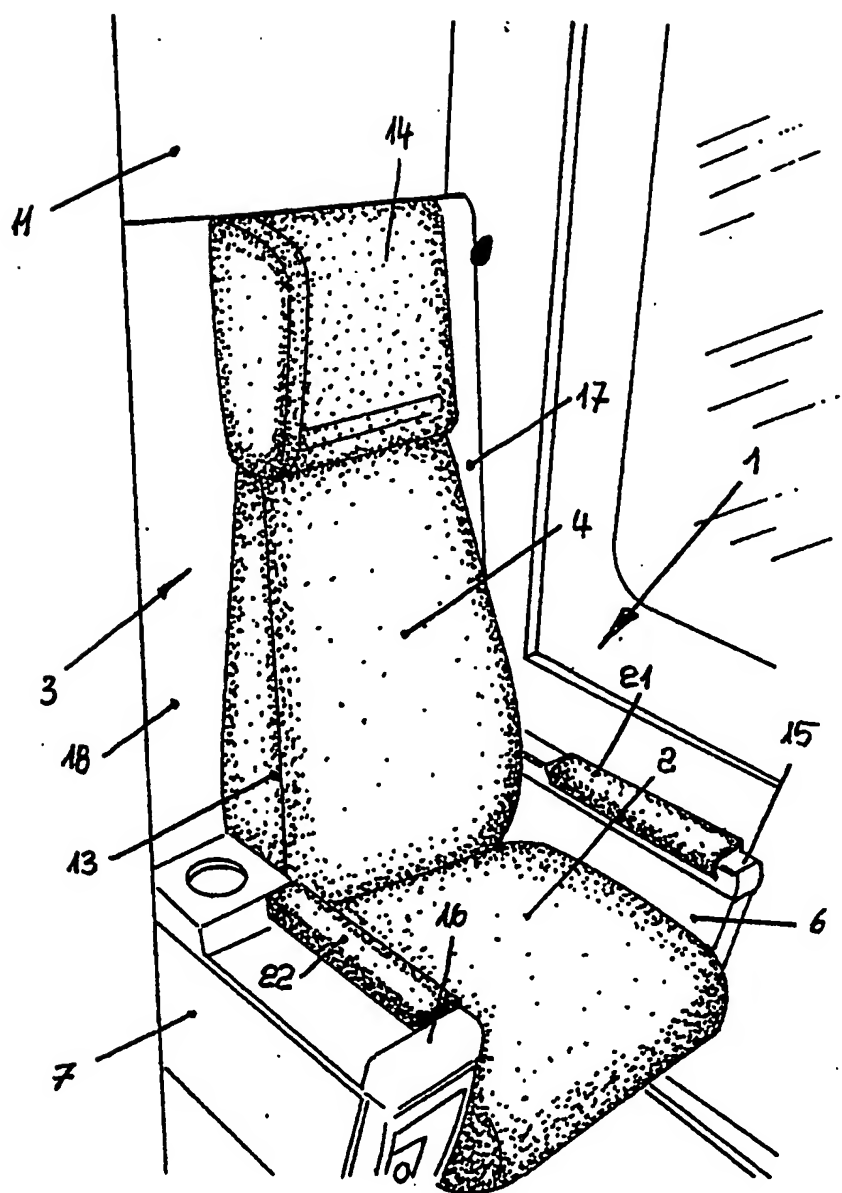


Fig. 6

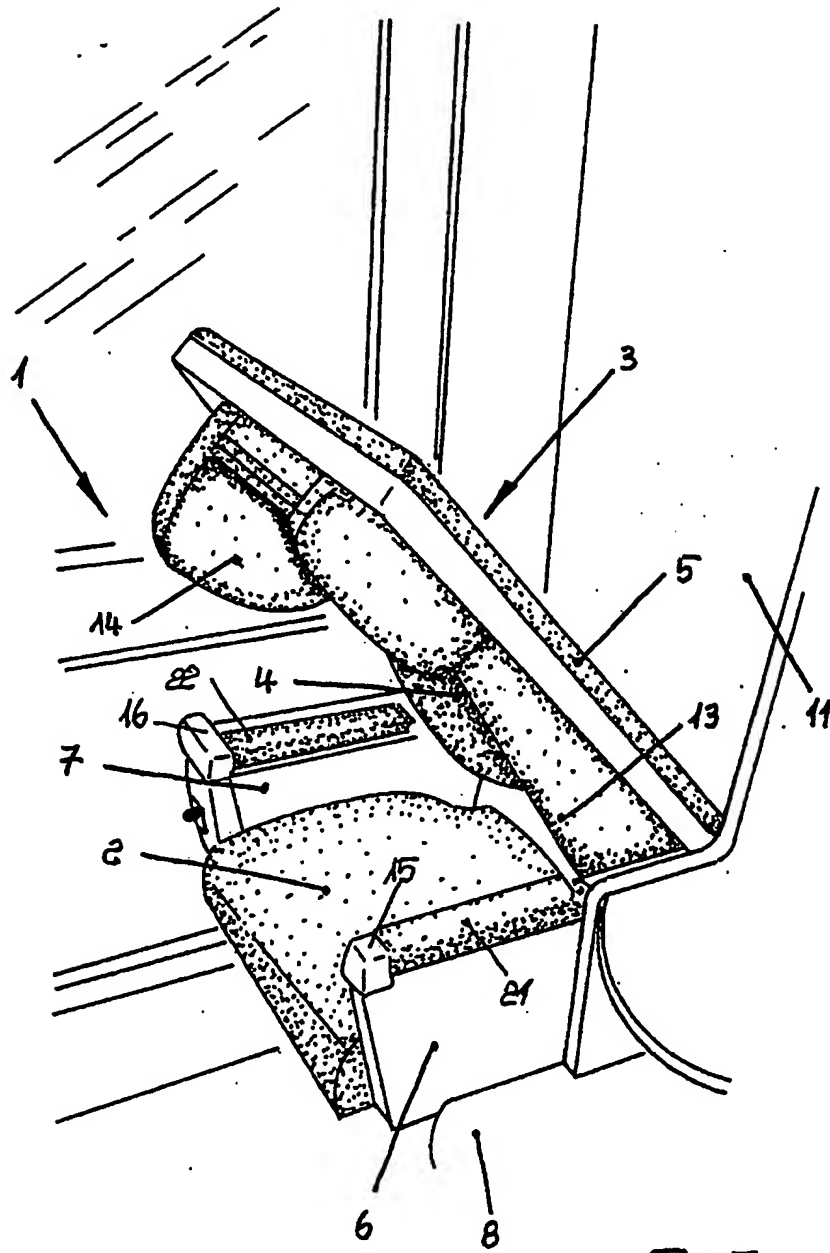


Fig. 7

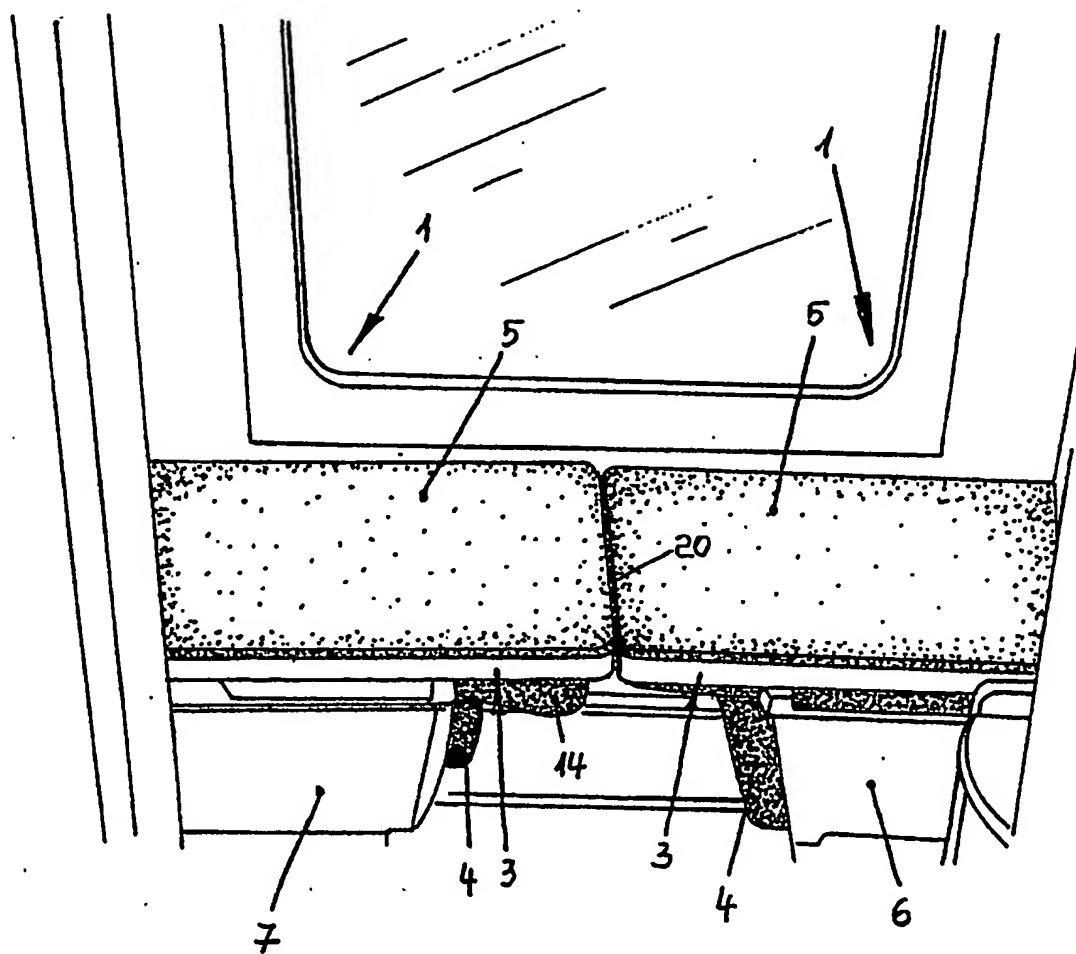


Fig. 8

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